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NEWTON's TELECOM DICTIONARY

The Official Dictionary of Telecommunications Networking and Internet

16th and a Half Updated, Expanded and Much Improved Edition JULY 2000

SCSI-2 SCSI-2 (pronounced Scuzzie-Two) is a 16-bit implementation of the 8-bit SCSI bus. Using a superset of the SCSI commands, the SCSI-2 maintains downward compatibility with other standard SCSI devices while improving upon reliability and data throughput. SCSI-2 is capable of transferring data at rates up to 10 megabytes per second, twice as fast as SCSI-1. SCSI-2 defines more than a speed. It defines a command set and electrical characteristics. See SCSI Transfer Rate

SCSI Transfer Rate SCSI transfer rate is the speed of moving data between the SCSI adapter board and the SCSI device. Host transfer rate is the speed of moving data between the adapter board and the host PC. See SCSI and SCSI-II. Some hard disks come as SCSI. One way of distinguishing between these SCSI disks is to look at at the pinning on the SCSI hard disks. There are three basic varieties of SCSI hard disks:

- 50-Pin. Ultra SCSI, 20 megabyte per second transfer rates, standard 50-pin cable which is backwards compatible with previous SCSI connections. Maximum cable length is 4.5ft.
- 68-Pin. Ultra Wide, 40 megabyte per second transfer rate, 68-pin Wide Cable requires Ultra Wide Controller for maximum transfer rates and optimal performance.
- 80-Pin. Ultra Wide SCA, 40 megabyte per second transfer rate, Single connector Drive designed to plug into systems with 80 pin back plane. Thus no controller Card and no Cable.

SCTE Society of Cable Telecommunications Engineers, Inc. A not-for-profit professional organization organized in 1969 to promote the sharing of operational and technical knowledge in the field of cable TV and broadband communications.

ScTP 1. Screened Twisted Pair. A type of Shielded Twisted Pair (STP) cable which employs a braided screen shield to protect the signal-carrying conductors from EMI (ElectroMagnetic Interference). See also FTP and UTP.
2. Simple Computer Telephony Protocol. SCTP is an Internet protocol authored by Brian McConnell (PhoneZone.Com) and Paul Davidson (Nortel). The protocol, modeled after other Internet application protocols (such as HTTP (worldwide web), SMTP (email), etc), creates a simple, cross-platform interface for building computer telephony applications. Unlike APIs such as TAPI and TSAPI, SCTP can be implemented on any machine which is capable of talking to TCP/IP networks. APIs, on the other hand, are operating system specific. The protocol is primarily intended for use in call control and system administration software. It is not used to create interactive voice response applications. Several vendors, such as Nexpath, a PC PBX manufacturer, have used the protocol to create cross-platform Java CTI applets which will run on virtually any operating system. SCTP is public domain, meaning the specification is public, and that anybody can use the protocol freely. www.phonezone.com/sctp

ScTP RJ-45 Plug These are used to terminate four pair ScTP patch cords. They have metal areas to connect the cable's foil shield with the equipment that it is plugged into.

SCVF Single Channel Voice Frequency.

SCWID Spontaneous Call Waiting Display.

SCxbus An SCSA term. The standard SCSA bus for communication between nodes. The SCxbus features the same architecture as the SCbus. See SCxbus Adapter.

SCxbus Adapter Inter-box expansion adapter for the SCbus.

SD Starting Delimiter

SDE 1. Synchronization Distribution Expander.
2. Secure Data Exchange as defined by the IEEE 802.10 security committee.

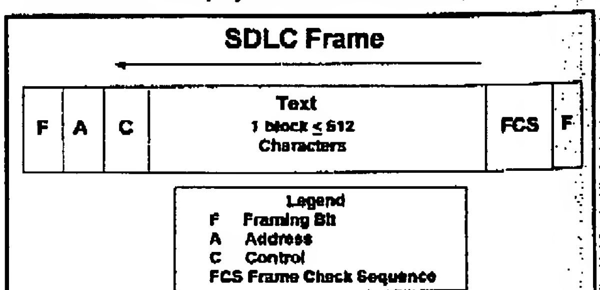
SDF Sub Distribution Frame. Intermediate cross connect points, usually located in wiring or utility closets. A trunk cable or LAN backbone is run from each SDF to the MDF (Main Distribution Frame).

SDH Synchronous Digital Hierarchy. A set of international fiber-optic transmission standards planned developed by the CCITT. SDH was based on the North American SONET standards, which now are considered to be a subset of SDH. See SONET for a much fuller explanation.

SDK Software Development Kit.

SDL 1. Specification and Description Language. A language defined in ITU-T Z.100 for telecommunication.
2. Signaling Data Link.

SDLC Synchronous Data Link Control. A bit-oriented synchronous communications protocol developed by IBM. SDLC is at the core of IBM's SNA (System Network Architecture). Intended for high-speed data transfer between IBM devices of significance (read mainframes), SDLC forms data into packets known as frames, with as many as 128 frames being transmitted sequentially in a given data transfer. Each frame comprises a header, text and trailer. The header consists of Framing bits (F) indicating the beginning of the frame, Address information (A), and various Control data (C). The data payload, referred to as Text, consists of as many as 7 blocks of data, each of as many as 512 characters. The trailer comprises a Frame Check Sequence (FCS) for error detection and correction, and a set of Framing bits (F) indicating the end of the frame. SDLC is a protocol which supports device communications generally conducted over high-speed, dedicated private line, digital circuits. SDLC can operate in either point-to-point or multipoint network configurations. See also HDLC and IBM. Contrast with Binary Synchronous Communications.



SDLC-To-Token-Ring LLC Transformation A technique to integrate SDLC link-attached SNA devices into a LAN/WAN internet. A modified remote polling process is used to make the link-attached devices appear to be LAN-attached.

SDM 1. Subrate Data Multiplexing. A European term. In North America, it's called SRDM.
2. DMS SuperNode Data Manager.

SDMA Station Detail Message Accounting. See Call Accounting.

SDMF Single Data Message Format. See Caller ID Message Format.

SMDI Secure Digital Music Initiative. Backed by the Recording Industry Association of America (RIAA), this initiative is working on a standard which can be built into digital music files and players to prevent illegal copies from being made.

SDN Software Defined Network. See SoftwarebDefined Network, SDN Serving Office, Virtual Network, VPN and the Appendix.

SDN Serving Office One of many AT&T-supplied switching nodes in an SDN network. See also Software Defined Network andthe Appendix.

SDR Session Detail Record
Record). Refers to detail re
captured and processe
accounting system. Similar
processed by a call accoun

SDRAM Synchronized Dy
an emerging replacement
access cycles are synchron
eliminate wait time associa
RAM and the CPU. See als

SDRM Sub-rate Data Mult
DS0 (64 Kbps) channel
five 9.6 Kbps signals, ten 4
signals. Although speeds
determines the number of

SDP 1. Session Descriptio
RFC2327, SDP is intended
sessions over IP-based n
announcement, session in
initiation. Session Initiatio
also SIP. See TAPI 3.0 for
2. Service Delivery Poin
(MPOE), where the comm
(demarcation point). The
local loop, which is the re
inside wire and cable sys
either the end user or the

SDS Short Data Service.
transmission of short al
European TETRA (TErres
system. SDS is much like
cellular networks. See TE

SDSAF Switched Digital
group of manufacturers a
dardize the interconnectio
switched 56 channel loc
group is based in Resto
"phone" call between mu
through. In short, this gro
the voice dial up phone s

SDSL Symmetrical Digit
HDSL2 (High-bit-rate Dig
Single line DSL. SDSL te
up to 2.3 Mbps both way
over a single twisted-pai
up to about 10,000 feet
aimed at the corporate a
upstream and downstrea
ing (April 2000), the ITU
development as G.shds
HDSL2, IDSL, RADSL an

SDT Structured Data Tra
which data is structured
ed into cells for transfer.

SDTV Standard Definitio
rent NTSC analog TV sta
than HDTV (High Definit
approved standards for
term for HDTV. ATV deliv
pixels (picture elements
(horizontal:vertical). AT
Thereby, ATV offers mu
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carrying four data streams at 10 Gbps each, traveling more than 450 kilometers without regenerators.
Here is MCI's explanation of how the Soliton technology works: A Soliton is a type of wave or, in the case of optical fiber, a narrow pulse of light that retains its shape as it travels long distances along the fiber. The Soliton's ability to keep its shape helps to overcome the problem of lightwave dispersion, and the consequent loss of data integrity, as the data-carrying lightwave travels over long distances. Modern Soliton technology is based on a phenomenon first documented in 1834 by a Scottish engineer named John Scott Russell who, while watching a boat being drawn along a canal by a pair of horses, noticed that when the boat stopped suddenly, the wave of water created by the bow continued forward at great velocity without losing speed or shape. Russell was convinced that the Soliton was an important scientific discovery. But his theory wasn't fully borne out until the 1960s when scientists began to learn that many phenomena in such fields as physics, electronics and biology can be explained by Solitons. The key elements of Pirelli's 10 Gbps Wavelength Division Multiplexed systems are the Soliton converters, which transmit and receive traffic. The Soliton transmitter generates a pulse with the proper shape and power to allow for the transmission of data and voice traffic over very long distances without electronic regenerators. Eliminating regenerators is important as MCI continues its transition to an all-optical networking environment. Electronic regenerators are bit-rate- and protocol-dependent. Removing them creates transparency, a key tenet in the creation of the purely optical network. In the Pirelli Soliton trials, MCI also evaluated a new technology, known as Dispersion Compensation Grating (DCG). DCG overcomes the distortion of the optical signals as they are transmitted through the network. Instead of trying to compensate for large amounts of signal dispersion at the end of a network, DCG periodically removes the distortion where needed along the transmission line.

Solution IBM-speak to solve, as in "We've got to solution this problem if we're going to make the sale."

Solution Assembler Another name for a system integrator. A vendor who puts together a collection of products which purport to be the solution/s to your IS problem.

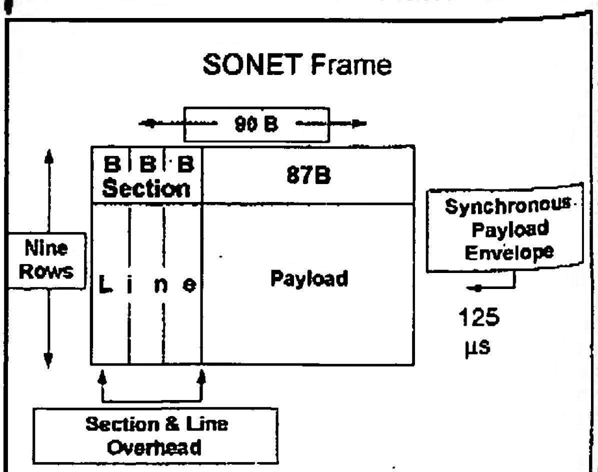
SOMO Acronym for Small Office Medium Office.

SON Service Order Number. The SON is the number issued by the local exchange carrier to confirm the order for the ISDN service. It provides a matching number for cross referencing the order to the phone company.

SONAR 1. SOund Navigation And Ranging. A system for underwater detection and location of objects through the use of acoustics. An active SONAR acoustical transmitter emits an acoustical "ping" signal at a frequency of 3500 Hz (Hertz). If the signal strikes a solid object, some of the acoustical energy is reflected in the form of an echo. Since the acoustical signal travels at approximately 1500 meters per second, the transmitter/receiver can calculate the distance of the solid object that caused the return. Further, the strength of the return ping can be calculated to provide information relative to the size and physical composition of the target object. As this acoustical echolocation technique is overt, the target object may be able to sense that it is being "pinged." Passive SONAR devices simply listen for acoustical signals, thereby remaining covert, which can be a decided advantage for an attack submarine, destroyer or other warship. Fish finders are active SONAR devices, but the fish don't seem to react to the fact that they have been "pinged." See also Ping.

2. A service that, when presented with a list of IP (Internet Protocol) addresses, attempts to order that list according to the proximity from the SONAR server. SONAR can be of value in assisting networked applications to make reasonable choices between alternative hosts in consideration of their proximity, as a "nearby" application server offers better service than a "distant" one. SONAR does not attempt to gauge the relative service levels offered by networked applications at different addresses in terms of round-trip time, hop count or available bandwidth. Rather, SONAR attempts to offer a "good" choice without consuming significant network or host resources in making that choice. Essentially, SONAR ranks host availability according to various speed-of-response service metrics, which can be affected by route distance, hop count, bandwidth availability, and application availability. While SONAR is not widely implemented at this time, it offers the advantage of avoiding the embedding of complex proximity algorithm logic in network clients. "SONAR" is intended as a pun on the "ping" utility that uses ICMP (Internet Control Message Protocol) packets to determine if an IP address has a working (i.e., installed and online) IP protocol stack. See also ICMP and Ping.

SONET Synchronous Optical NETwork. A family of fiber optic transmission rates from 51.84 million bits per second to 13.27 gigabits (thousand million) per second (and going higher, as we speak), created to provide the flexibility needed to transport many digital signals with different capacities, and to provide a design standard for manufacturers. SONET is an optical interface standard that allows interworking of transmission products from multiple vendors (i.e., mid-span meets). It defines a physical interface, optical line rates known as Optical Carrier (OC) signals, frame format and an OAM&P protocol (Operations, Administration, Maintenance, and Provisioning). The OC signals have their origins in electrical equivalents known as Synchronous Transport Signals (STSs). The base rate is 51.84 Mbps (OC-1/STS-1). Higher rates are direct multiples of the base rate. SONET development began at the suggestion of MCI to the Exchange Carriers Standards Association (ECSA). Bellcore then took over the project, and it ultimately came to rest at the American National Standards Institute (ANSI). Much of the development was carried out by ECSA under the auspices of ANSI. Work started on the SONET standard in the ANSI accredited T1/X1 committee in 1985, and the Phase 1 SONET standard was issued in March 1988. SONET has also been adopted by the ITU-T (International Telecommunications Union-Telecommunications



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for SONET development.
interleaves frames of data in
a synchronous high speed
Transport Signal (STS). Th
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mapped into sub-STS-1 s
(VTs), or Virtual Containers
51.84 Mb/s STS-1 signal as
rate signals are multiples of
signal has a rate of 12 x 51.
frame format consists of 90
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supports the OAM&P functic
communication channel that
cation path between multipl
elements. The Synchronou
payloads in any of three way
1. As a continuous 50.11 M
chronous DS-3, and other
Mb/s capacity in asynchron
format;
2. In a VT (Virtual Tributary
modate DS-1, DS-1C, DS-2
based services (see chart
either an asynchronous or b
3. As concatenated paylo
requiring more than 50.11 M
STS-1 SPEs may be concat
ISDN signal of 135 Mb/s. A
AT&T, the main SONET char
N x 51.84 Mbps; Optical
meet; Intra office mixed
channels for OAM&P functic

SONET rates are

OC Level	Line Rate
OC-1	51.84 Mbps
OC-3	155.52 Mbps
OC-9	466.56 Mbps
OC-12	622.08 Mbps

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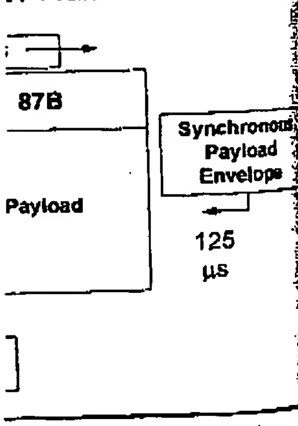
:T Frame



Standardization Sector), nee ITU. The ITU-T version is known as SDH (Synchronous Digital Hierarchy), which varies slightly and most obviously in terms of the fact that the SDH levels begin at 155 Mbps. In SDH, the fundamental building blocks are known as STMs (Synchronous Transport Modules) and are equivalent in rate to three SONET STS-1s. SONET is intended to attain the following goals: Multi-vendor interworking, to be cost effective for existing services on an end-to-end basis, to create an infrastructure to support new broadband services and for enhanced operations, administration, maintenance and provisioning (OAM&P). SONET offers many advantages over asynchronous transport including: Opportunity for back-to-back multiplexing, digital cross-connect panels; Easy evolution to broadband transport; Compatibility with evolving operations standards; Enhanced performance monitoring and extension of OAM&P capabilities to end users. SONET/SDH offers the critical advantage of a standard to which manufacturers can build fiber optic gear in order to ensure interconnectivity and (at least some level of) interoperability. Thereby, carriers can safely acquire and deploy multi-vendor networks without being wed to a single manufacturer. This last point was, in fact, the primary impetus for SONET development. SONET transmission equipment interleaves frames of data in simple integer multiples to form a synchronous high speed signal known as a Synchronous Transport Signal (STS). This permits easy access to low speed signals (e.g. DS-0, DS-1, etc.) without multi-stage multiplexing and demultiplexing. The low speed signals are mapped into sub-STS-1 signals called Virtual Tributaries (VTs), or Virtual Containers (VCs) in SDH. SONET uses a 51.84 Mb/s STS-1 signal as the basic building block. Higher rate signals are multiples of STS-1 (e.g. the STS-12/OC-12 signal has a rate of 12 x 51.84 Mb/s or 622.080 Mb/s). The frame format consists of 90 x 9 bytes. The SONET frame format is divided into two main areas: Synchronous Payload Envelope (SPE) and Transport Overhead (TOH). The SPE contains the information being transported by the frame. The TOH supports the OAM&P functions of SONET, and includes a data communication channel that provides an OAM&P communication path between multiple interconnected SONET network elements. The Synchronous Payload Envelope can handle payloads in any of three ways:

1. As a continuous 50.11 Mb/s envelope for carrying asynchronous DS-3, and other payloads requiring up to 50.11 Mb/s capacity in asynchronous (byte invisible) or byte visible format;
2. In a VT (Virtual Tributary) structured envelope to accommodate DS-1, DS-1C, DS-2, European CEPT1, or future VT based services (see chart below). These signals can have either an asynchronous or byte visible format; and
3. As concatenated payloads to accommodate services requiring more than 50.11 Mb/s capacity. For example, three STS-1 SPEs may be concatenated to transport a broadband ISDN signal of 135 Mb/s. According to

AT&T, the main SONET characteristics are: A family of rates at N x 51.84 Mbps; Optical interconnect allowing mid-span meet; Intra office mixed vendor interconnects; Overhead channels for OAM&P functions and Synchronous networking.

SONET rates are

OC Level	Line Rates	Capacity
OC-1	51.84 Mbps	28 DS1s or 1 DS3
OC-3	155.52 Mbps	84 DS1s or 3 DS3s
OC-9	466.56 Mbps	252 DS1s or 9 DS3s
OC-12	622.08 Mbps	336 DS1s or 12 DS3s
OC-18	933.12 Mbps	504 DS1s or 18 DS3s
OC-24	1.244 Gbps	672 DS1s or 24 DS3s
OC-36	1.866 Gbps	1008 DS1s or 36 DS3s
OC-48	2.488 Gbps	1344 DS1s or 48 DS3s
OC-96	4.976 Gbps	2688 DS1s or 96 DS3s
OC-192	9.953 Gbps	5376 DS1s or 192 DS3s
OC-255*	13.21 Gbps	7,168 DS1s or 256 DS3s

The next rate, on which development work is already underway, will be OC-768 (39.813 Gbps).

In North America, SONET rates have been limited to OC-1 plus those compatible with European SDH. Thus only OC-3, OC-12, OC-48, and OC-192, which are equivalent to SDH-1, SDH-4, SDH-16, and SDH-64 respectively; are standard.

OC-256 is a bit iffy. Bellcore standards documents state "SONET optical transmission systems support only certain values of N. Currently, these values are 1, 3, 12, 24, 48, and 192." Although OC-256 does not fit into the power of two progression above OC-3 as the rest do, it has still been considered by some as being the next rate to be implemented after OC-192, or the jump may go directly to OC-768.

SONET/SDH networks typically are deployed in a ring physical topology, with multiple fibers providing redundancy. In the event that a given fiber suffers a catastrophic failure, one or more other fibers are available. The rings are of two types: Line-Switched and Path-Switched. SONET also may be deployed in a linear physical topology, in which case the system operates as a logical ring. See also ADM, Line Switched Ring, Path Switched Ring, SONET Interface Layers, SONET Ring, STM, Stratum Level and STS.

SONET Head A device on the end of a boring machine. Such machine is used to bore holes under highways, rivers and sundry obstructions. The SONET head contains sensors which can help determine what it is about to strike as it moves ahead underground. The SONET head will signal the person operating the boring machine what lies ahead and hopefully, the operator, is sufficiently intelligent to move the boring machine up or down or sideways in order to miss the potential obstruction — which might be anything from a rock to another fibre cable to a high voltage AC power line.

SONET Interface Layers The SONET standards define four interface layers. Each layer requires the services of all lower-level layers to perform its functions. While conceptually similar to layering within the Open System Interconnection (OSI) reference model, SONET itself corresponds only to the OSI Physical Layer. The SONET interface layers are:

1. Physical Layer: Handles bit transport across the physical medium; primarily responsible for converting STS (electrical) signals to and from OC (optical) signals. Once the signal has been expressed optically, this layer is sometimes referred to as the photonic layer. Electro-optical devices communicate at this layer;
2. Section Layer: Transports STS-N frames and Section Overhead (SOH) across the medium; functions include framing, scrambling, and error monitoring. Section Terminating Equipment (STE) communicate at this layer;
3. Line Layer: Responsible for the reliable transport of the Synchronous Payload Envelope (SPE) (i.e., user data) and Line Overhead (LOH) across the medium; responsibilities include synchronization and multiplexing for the Path Layer and mapping the SPE and LOH into an STS-N frame. An OC-N-to-OC-M multiplexer is an example of Line Terminating Equipment (LTE); and
4. Path Layer: Handles transport of services (e.g., DS-1, DS-3, E-1, or video) between Path Terminal Equipment (PTE); the